From: Coltrain, Katrina
To: pappel@eaest.com; Turner, Philip; Beauchemin, Melissa; ccheatwood@eaest.com
Cc: todd.downham@deq.ok.gov
Subject: FS and PRGs
Date: Friday, October 2, 2020 2:47:00 PM
Attachments: WilcoxBaP1200soil-waste EPA draft 9-30-20.pdf
Wilcoxlead200soil-waste EPA draft 10-1-20.pdf
Wilcoxlead800soil EPA draft 10-1-20.pdf
Wilcoxlead400soil EPA draft 10-1-20.pdf
Wilcox Soil-Sediment PRGs-volumes-justification draft 10-1-20.docx

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Pat, Please find attached the latest information based on my meeting with management and discussions with the DEQ. Additional review of BaPyrene and ground water is underway and may result in additional PRGs.

If we need a call to discuss further, let me know.

Here is the path forward for lead. In the FS, the evaluation will use the resident lead PRG based on 5ug/dl blood lead for children (200mg/kg) and the resident lead PRG based on 10ug/dl blood lead for children (400mg/kg)/5ug/dl blood lead for adults (industrial worker). The assumption is that the ETF, LPA, and the residential properties in the WPA will be used for residential in the future. The remaining portion of Wilcox is assumed to be industrial and the 400 mg/kg lead PRG will apply.

NTF – no action
LDA – no action
ETF – 4 points in the field that exceed
LPA – lead 200 mg/kg
Wilcox resident area (on the process area and the resident near tank 11): 200 mg/kg
Wilcox remaining areas: 400 mg/kg

For added comparison, the following volumes should be presented for the range of possible lead cleanup levels. This will provide DEQ and EPA with the range of options based on PRG and volume estimates when it comes time to develop the proposed plan and ROD.

Area	200 mg/kg lead (5ug/dl blood lead resident child)	400 mg/kg lead (10 ug/dl blood lead resident child and 5ug/dl blood lead adult worker)	800 mg/kg lead (10 ug/dl blood lead adult worker)
LPA	X (resident)	X (resident)	No industrial use
WPA	X (resident areas)	X (resident areas) X (industrial area)	X (industrial area)
ETF	X (resident)	X (resident)	

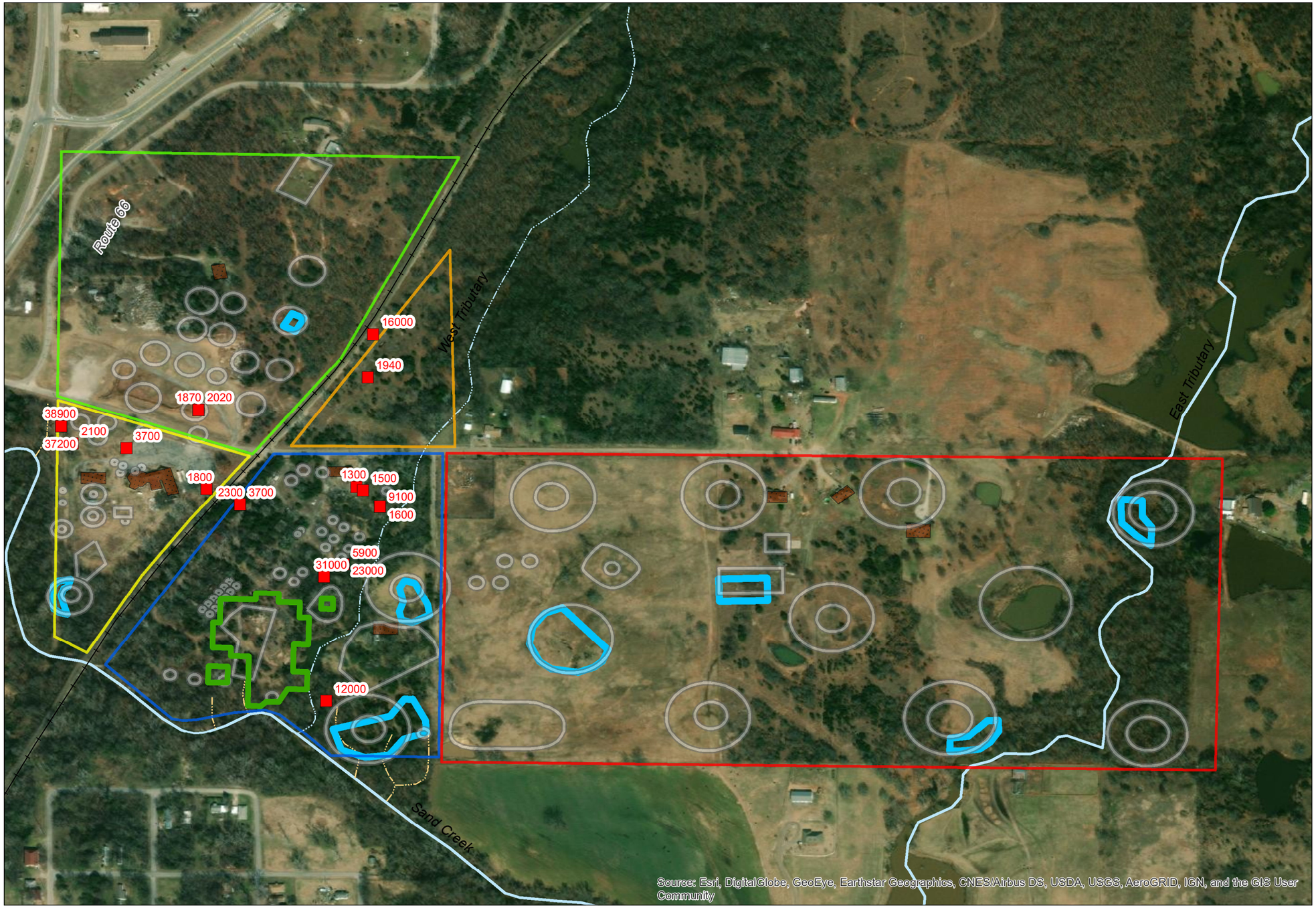
Additionally, there needs to be text indicating that it is assumed no further action within the LAA will be needed due to the completion of the early/interim remediation action. However, there is uncertainty in that the remediation is limited to 2ft depth and there is the potential for high concentrations of lead soil (above these PRGs) to remain. Should this happen, then the volumes estimated in the FS will need to be adjusted to include the removal of these additional soils as part of the site-wide remediation. At the time the FS was completed, the

interim/early action had not been completed.

Primary Points.

1. No unacceptable human health risk (carcinogenic or non-carcinogenic) was identified for the North Tank Farm, Loading Dock Area, the East Tank, sediment or surface water; therefore, no further action is proposed.
2. Unacceptable risk was identified for lead in the Lorraine Process Area and the Wilcox Process area; therefore, further remediation based on exposures to lead are proposed.
3. Benzo(a)pyrene: the risk assessment did not identify unacceptable risk related to exposure to benzo(a)pyrene based on any of the evaluated scenarios (residential, industrial, commercial, or trespasser); however, there are areas where the concentrations of benzo(a)pyrene are high. The risk assessors are reviewing the high concentration areas in the Lorraine Process Area and the Loading Dock Area to determine if there is unacceptable risk to a resident based on the typical/reasonable sized residential plot. As you will recall, the risk assessment evaluated risks based on the whole area as a residential plot. Based on the results of this further review, there may or may not be a proposed PRG for benzo(a)pyrene.
4. The ecological risk assessment identified potential risk from exposures to lead and vanadium. No PRGs are proposed because these exposures are collocated with the human health PRG for lead.
5. Additionally, language will be included in the FS to support the typical/reasonable sized residential plot review as it relates to the 4 lead locations within the east tank farm that have concentrations >200mg/kg and/or>400mg/kg.

Katrina Higgins-Coltrain
Remedial Project Manager
U.S. Environmental Protection Agency, Region 6
Remedial Branch (SEDRL)
1201 Elm Street, Suite 500
Dallas, Texas 75270-2102
214-665-8143



0 200 400 800 Feet

1 inch = 432 feet

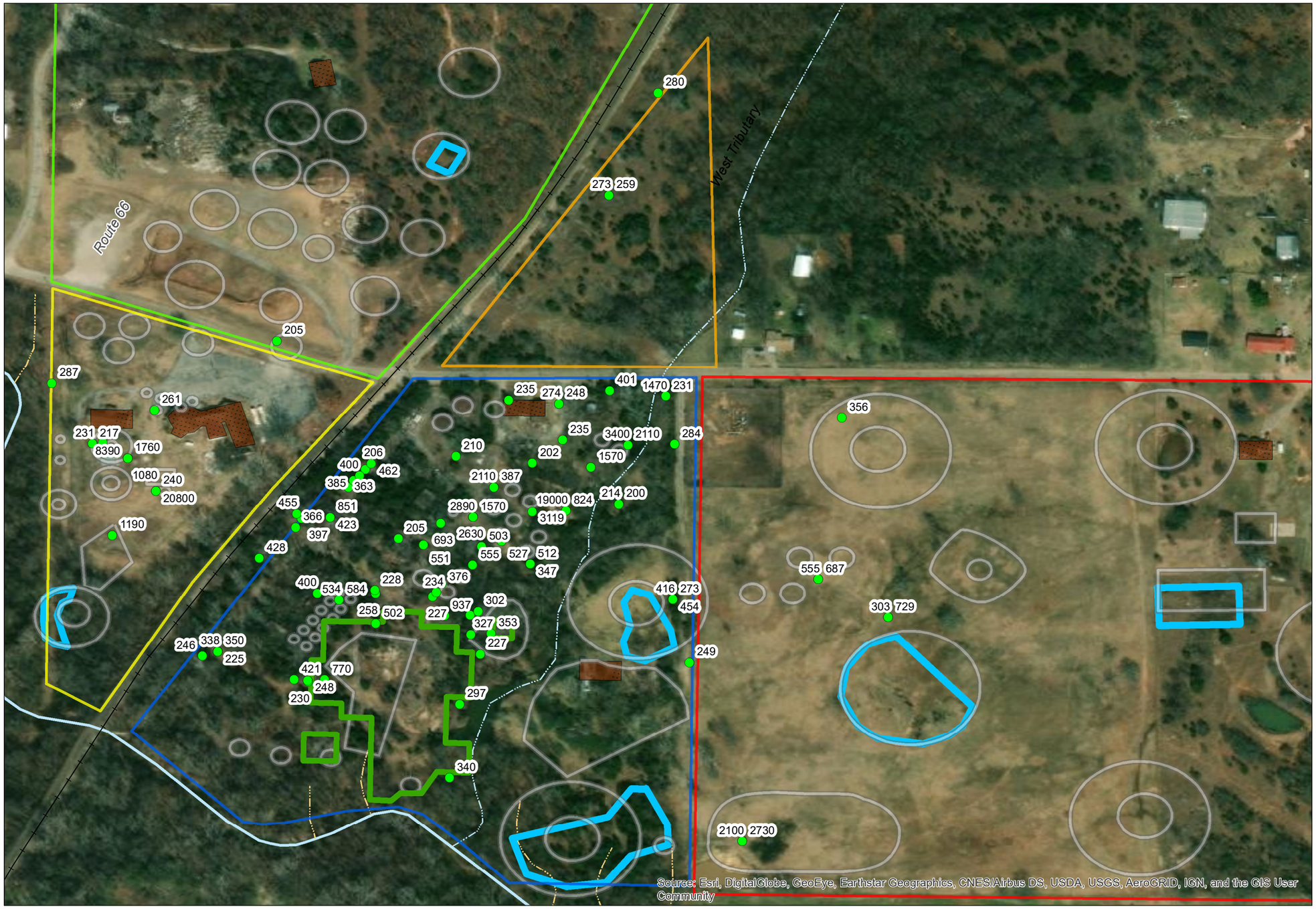
Legend

- BaP1200waste Events
- BaPyrene120... Events
- Railroad
- East Tank Farm
- Loading Dock Area
- Lorraine Process Area
- North Tank Farm
- Wilcox Process Area
- Proposed Lead Excavation Area
- Historical Feature
- On-site Building
- Estimated Tank Waste Excavation Areas (Source Control ROD)
- Drainage
- Stream, Intermittent
- Stream, Perennial

Image Source: National Agriculture Imagery Program 2015.

Wilcox Oil Company Superfund Site
Bristow, Creek County, Oklahoma

Benzo(a)pyrene>1200 ug/kg- EPA DRAFT for Discussion 9-30-20



0 200 400

1 inch = 258 feet

Legend

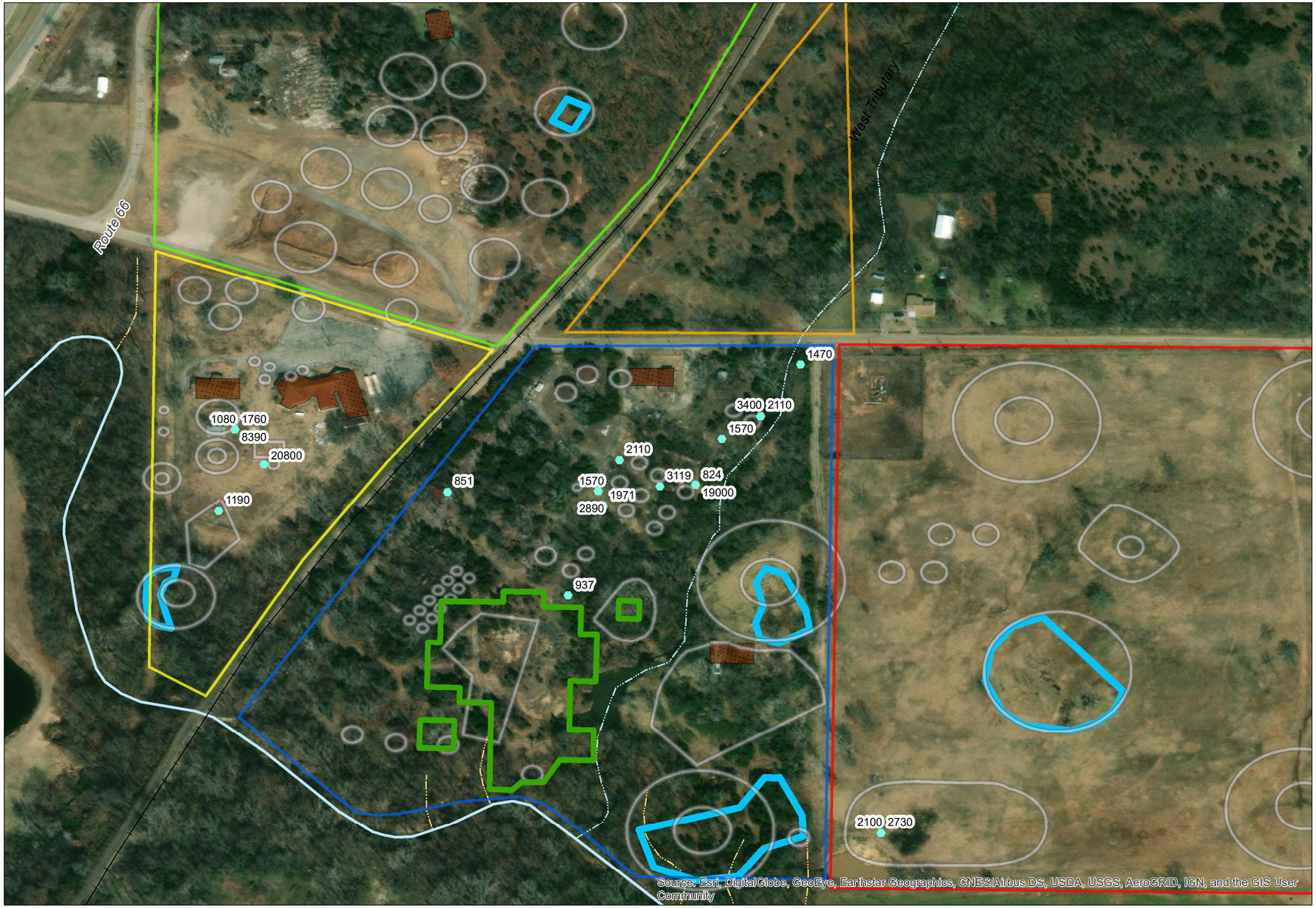
- lead200soil_... Events
- HQ_Pb_delin... Events
- lead200waste1 Events
- Railroad
- East Tank Farm
- Loading Dock Area
- Lorraine Process Area
- North Tank Farm
- Wilcox Process Area
- Proposed Lead Excavation Area
- Historical Feature
- On-site Building
- Estimated Tank Waste Excavation Areas (Source Control ROD)
- Drainage
- Stream, Intermittent
- Stream, Perennial

Image Source: National Agriculture Imagery Program 2015.

Wilcox Oil Company Superfund Site
Bristow, Creek County, Oklahoma

Lead>200 mg/kg soil and waste- EPA DRAFT for Discussion
10-1-20

2020 -10-01 C:\Users\khiggins\Documents\ArcGIS\Packages\WilcoxEPA_Export202003_78007FF8-3A21-4689-A417-76711D8F0169\v107\WilcoxEPA_Export.mxd EA-Dallas KHiggins



0 200 400

1 inch = 246 feet

Legend

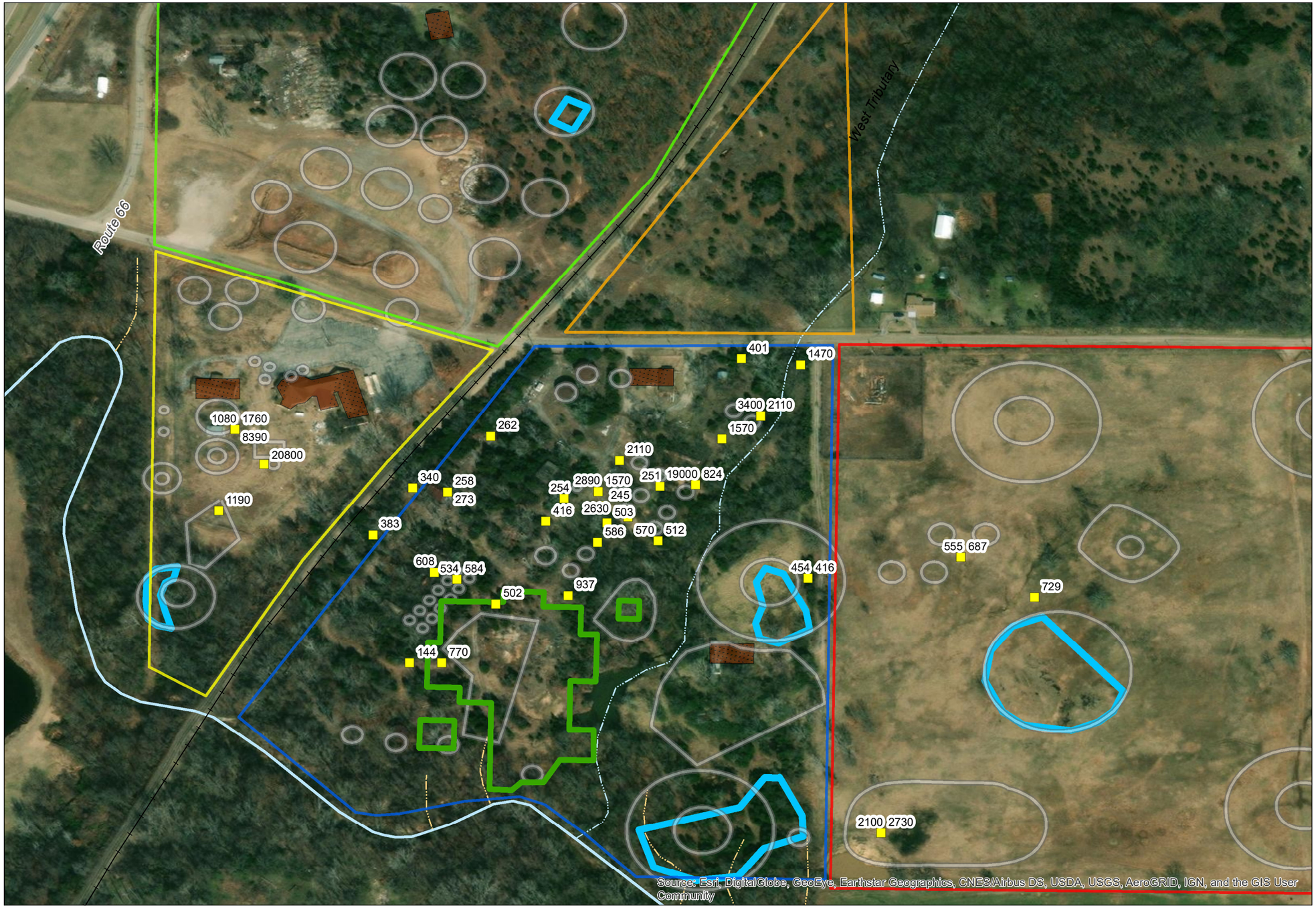
- HQ_Pb_delin... Events
- lead800soil_... Events
- Railroad
- East Tank Farm
- Loading Dock Area
- Lorraine Process Area
- North Tank Farm
- Wilcox Process Area
- Proposed Lead Excavation Area
- Historical Feature
- On-site Building
- Estimated Tank Waste Excavation Areas (Source Control ROD)
- Drainage
- Stream, Intermittent
- Stream, Perennial

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Image Source: National Agriculture Imagery Program 2015.

Wilcox Oil Company Superfund Site
Bristow, Creek County, Oklahoma

Lead>800 mg/kg soil - EPA DRAFT for Discussion 10-1-20



0 200 400

1 inch = 246 feet

Legend

- HQ_Pb_delin... Events
- lead400soil_... Events
- Railroad
- East Tank Farm
- Loading Dock Area
- Lorraine Process Area
- North Tank Farm
- Wilcox Process Area
- Proposed Lead Excavation Area
- Historical Feature
- On-site Building
- Estimated Tank Waste Excavation Areas (Source Control ROD)
- Drainage
- Stream, Intermittent
- Stream, Perennial

Image Source: National Agriculture Imagery Program 2015.

Wilcox Oil Company Superfund Site
Bristow, Creek County, Oklahoma

Lead>400 mg/kg soil - EPA DRAFT for Discussion
10-1-20

1. **Sediment – Pond 1 and West Tributary**

RAO: Prevent human and ecological direct and ingestion exposures to the sediment with concentrations of contaminants of potential concern (COPCs) exceeding the lead preliminary remediation goal (PRGs) of 200 mg/kg.

RAO: Minimize migration of sediment COPCs into the ground water, surface water, and Sand Creek

Lead: 200mg/kg
Justification:

- Pond is adjacent to the lead additive area and received run-off containing concentrations of lead exceeding the ecological risk
- This tributary is routinely dry and is considered accessible as soil
- The pond and tributary discharge surface water and sediment containing concentrations of lead to Sand Creek.
- Calculated lead PRG for blood lead levels not exceeding 5% chance of 5ug/dL for residential child

2. **Soil**

RAO: Prevent human and ecological direct and ingestions exposures to the soils with concentrations of contaminants of potential concern (COPCs) exceeding the 200 mg/kg, residential and the industrial lead PRG of 400 mg/kg.

RAO: Minimize migration of soil COPCs into the ground water, surface water, sediment, and other site soils.

Lead: 200mg/kg residential
Lead: 400 mg/kg industrial areas on Wilcox process area

Justification:

- Calculated lead PRG for blood lead levels not exceeding 5% chance of 5ug/dL for residential child
- Calculated lead PRG for blood lead levels not exceeding 5% chance of 5ug/dL for industrial worker: locations exceeding 400 and 500 mg/kg are identical. The 400mg/kg is the industrial PRG for not exceeding 5% chance of 5ug/dL blood lead and the PRG for residential blood lead levels not exceeding 5% chance of 10ug/dL blood lead.

Place holder for Benzo(a)pyrene pending additional review

RAO: Prevent human direct and ingestion exposures to the soil with concentrations of contaminants of potential concern (COPCs) exceeding the benzo(a)pyrene PRG of (.12 resident at 10-6 or 1.2 mg/kg resident at 10-5)

Benzo(a)pyrene additional review.

It is noted that the HHRA evaluated potential residential human health risks based on exposure to the entire exposure area within each of the 5 site operational areas. However, these exposure areas are larger than areas that are typically evaluated as a residential yard. To further evaluate the surface soil medium of concern and potential concerns related to smaller exposure areas (i.e., potential residential yards), sample results were reviewed to determine if areas of high concentration are present within the five site operational areas. Areas of high concentration were identified for benzo(a)pyrene; therefore, there is a potential that isolated areas may be a potential human health concern for residential receptors.

To evaluate this, these areas of high concentrations will be further delineated to represent typical residential lots and potential risks will be evaluated.

Summary of Risk Findings

Human Health

- The risk assessment determined that excess cancer risks associated with exposures to site media (except ground water) under any of the scenarios evaluated for any of the 5 site areas did not exceed the EPA acceptable cancer risk range (1x10-6 to 1x10-4). Excess Cancer risks are within or less than the risk range and did not exceed 1x10-4; therefore, health concerns related to excess cancer risks are not expected and no remediation based on excess cancer risk exposures are proposed.
- The risk assessment determined that excess cancer risks associated with exposures to surface water and sediment did not exceed the EPA acceptable cancer risk range (1x10-6 to 1x10-4) and that the noncarcinogenic hazards were below the level of concern (<1). Excess Cancer risks are within or less than the risk range and did not exceed 1x10-4 while noncarcinogenic hazards were below the level of concern (<1); therefore, no remediation based on excess cancer risk or non-cancer risk exposures are proposed.
- The risk assessment determined that excess cancer and non-cancer risks associated with exposures to ground water are present under the residential and industrial scenarios; therefore, remediation based on excess cancer risk or non-cancer risk exposures are proposed. [Pending technical memorandum review.]
- Lead concentrations in surface soil within the Lorraine Process Area and Wilcox Process Area revealed greater than 5% chance of the population (child resident) exceeding all reference blood-lead levels (5, 8 and 10) evaluated in the IEUBK. Remediation based on lead exposures is proposed for residential areas.
- The adult lead model indicated that the 5 µg/dL reference blood-lead level had greater than 5% chance of the population (adults) exceeding in the Lorraine and Wilcox Process Areas. Remediation based on lead exposure is proposed for industrial areas.

- The risk assessment determined that non-cancer risks associated with exposures to soil through the ingestion of home produce and beef are present for all areas, and is primarily associated with the metals cobalt, iron, and copper. These metals are sporadically detected across the soil medium, are collocated within proposed remediation areas, and are less than background (cobalt and copper). There is a high degree of uncertainty in the models because these pathways model potential health impacts from surface soil concentrations rather than actual produce and/or beef concentrations. Due to uncertainties associated with uptake from soil and the conservative assumptions in the model, the results presented here are likely an overestimation of potential risk. None of these metals were identified as significant contributors to risk or as significant contributors based on target organs. As such, these metals are not considered COPCs, and no remediation based on these metals is proposed.

Ecological

- The risk assessment determined that potential risks associated with exposures to lead in site soil (all 5 areas) are present for plants, insectivorous mammals, insectivorous birds, and herbivorous birds. Areas of concern are collocated with human health remediation areas; therefore, remediation based on an ecological lead exposure PRG is not proposed for soil.
- The risk assessment determined that potential risks associated with exposures to vanadium in the site soil (all 5 areas) are present for plants and insectivorous birds. Areas of concern are collocated with human health remediation areas; therefore, remediation based on an ecological vanadium exposure PRG is not proposed for soil.
- Potential risks to aquatic organisms in the ponds (cadmium, lead, BaPyrene) and streams (manganese) from elevated concentrations of contaminants in the water column are likely to be reduced following removal of contaminated soil in the uplands. No remediation based on potential risks associated with surface water is proposed.
- Concentrations of Total PAHs in stream sediment, when compared to the probable effects level (PEL) of 16.8 mg/kg (MacDonald et al 1996) indicates no potential risk to benthic organisms from total PAHs in stream sediments; therefore, no remediation based on potential risks to benthic invertebrates from PAHs is proposed.
- Because of infrequent detections of volatile organic compounds, the volatile nature of the chemicals, the absence of direct toxicological studies, and the unsubstantiated theoretical nature of the soil screening values, it is not expected that these VOCs would result in unacceptable risk to populations of soil invertebrates; therefore, no remediation based on potential risks to soil invertebrates from VOCs is proposed.
- It is unlikely that there would be adverse impacts to the plant or soil invertebrate communities at the site from sporadic elevated concentrations of metals (zinc, manganese, copper, and chromium) based on the following, and as a result, no remediation based on potential risks to plants or soil invertebrates is proposed.
    - Low HQs identified in the SLERA, based solely on a screen against EcoSSLs or screening benchmarks from Efroymson et al. (1997a,b).

- Low potential for uptake and toxicity from naturally occurring metals, many of which are essential nutrients.
- Sporadic elevated concentrations not linked to facility activities.
- Lack of sufficient ecological habitat from long-term and/or continued future industrial, residential, and agricultural usage of many portions of the site.
- Removal of select concentrations of metals during excavations for lead and/or benzo(a)pyrene, thus reducing the overall HQs.

Application of the PRGs across the sites based on current land use and future expected land use.

Area	Current Use	Future Use	Proposed Use for FS and PRG application	Justification
North Tank Farm	Residential	Residential	Residential	No Further Action
	Commercial/ Industrial	Commercial /Industrial	Residential Commercial /Industrial	No Further Action
East Tank Farm	Residential	Residential	Residential	Current and future use expected to remain unchanged; Lead PRG Residential
	Agricultural/ Livestock	Residential /Agricultural /Livestock	Residential	Current and future use expected to remain unchanged; Lead PRG Residential
Lorraine Process Area	Residential	Residential	Residential	Current and future use expected to remain unchanged; Lead PRG Residential Note: • Benzo(a)pyrene is currently under review. • Ground water is currently under review, and may require ICs.)
Wilcox Process Area	Residential	Residential/ Commercial/ Industrial	Residential/ Commercial/ Industrial	Current and future use expected to remain unchanged; Lead PRG residential portions and Lead PRG residential/Industrial portions Note: • Benzo(a)pyrene is currently under review. • Ground water is currently under review, and may require ICs.)
Loading Dock Area	Commercial/ Industrial	Commercial/ Industrial	Residential Commercial/ Industrial	Note: • Benzo(a)pyrene is currently under review.